

# Document made available under the Patent Cooperation Treaty (PCT)

International application number: PCT/CA05/000039

International filing date: 12 January 2005 (12.01.2005)

Document type: Certified copy of priority document

Document details: Country/Office: US  
Number: 60/535,495  
Filing date: 12 January 2004 (12.01.2004)

Date of receipt at the International Bureau: 30 March 2005 (30.03.2005)

Remark: Priority document submitted or transmitted to the International Bureau in compliance with Rule 17.1(a) or (b)



World Intellectual Property Organization (WIPO) - Geneva, Switzerland  
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January 28, 2005

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APPLICATION NUMBER: 60/535,495

FILING DATE: January 12, 2004

By Authority of the  
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16698 U.S. PTO

PTO/SB/18 (08-03)

Approved for use through 07/31/2006. OMB 0651-0032

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**PROVISIONAL APPLICATION FOR PATENT COVER SHEET**

This is a request for filing a PROVISIONAL APPLICATION FOR PATENT under 37 CFR 1.53 (c).

031431 U.S. PTO  
60/535495

011204

INVENTOR(S)					
Given Name (first and middle [if any])	Family Name or Surname	Residence (City and either State or Foreign Country)			
Jerry	Moscovitch	Toronto, Canada			
<input type="checkbox"/> Additional inventors are being named on the _____ separately numbered sheets attached hereto					
TITLE OF THE INVENTION (500 characters max)					
APPARATUS AND METHODS FOR PROVIDING AN UPGRADEABLE MULTI-MONITOR SYSTEM					
Direct all correspondence to: CORRESPONDENCE ADDRESS					
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ENCLOSED APPLICATION PARTS (check all that apply)					
<input checked="" type="checkbox"/> Specification Number of Pages		39		<input type="checkbox"/> CD(s), Number	
<input checked="" type="checkbox"/> Drawing(s) Number of Sheets		20		<input type="checkbox"/> Other (specify)	
<input checked="" type="checkbox"/> Application Data Sheet. See 37 CFR 1.76					
METHOD OF PAYMENT OF FILING FEES FOR THIS PROVISIONAL APPLICATION FOR PATENT					
<input type="checkbox"/> Applicant claims small entity status. See 37 CFR 1.27.				FILING FEE AMOUNT (\$)  160	
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Respectfully submitted,  
SIGNATURE

[Page 1 of 2]

Date

January 9, 2004

TYPED or PRINTED NAME

Jay M. Millman

REGISTRATION NO.  
(if appropriate)

52,520

Docket Number:

13772-2

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U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE**FEE TRANSMITTAL  
for FY 2004**

Effective 10/01/2003. Patent fees are subject to annual revision.

☐ Applicant claims small entity status. See 37 CFR 1.27TOTAL AMOUNT OF PAYMENT (\$)  
160.00**Complete if Known**

Application Number	not yet known
Filing Date	filed concurrently herewith
First Named Inventor	MOSCOVITCH, Jerry
Examiner Name	N/A
Art Unit	N/A
Attorney Docket No.	13772-2

**METHOD OF PAYMENT (check all that apply)**☒ Check ☐ Credit card ☐ Money Order ☐ Other ☐ None☐ Deposit Account:Deposit  
Account  
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022095

Bereskin &amp; Parr

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☐ Charge fee(s) indicated below ☒ Credit any overpayments☒ Charge any additional fee(s) or any underpayment of fee(s)☐ Charge fee(s) indicated below, except for the filing fee to the above-identified deposit account.**FEE CALCULATION****1. BASIC FILING FEE**

Large Entity Fee Code (\$)	Small Entity Fee Code (\$)	Fee Description	Fee Paid
1001 770	2001 385	Utility filing fee	
1002 340	2002 170	Design filing fee	
1003 530	2003 265	Plant filing fee	
1004 770	2004 385	Reissue filing fee	
1005 180	2005 80	Provisional filing fee	160.00
<b>SUBTOTAL (1)</b>			<b>(\$)</b> 160.00

**2. EXTRA CLAIM FEES FOR UTILITY AND REISSUE**

Total Claims	Extra Claims	Fee from below	Fee Paid
Independent	- 20 ** =	X	0.00
Multiple Dependent	- 3 ** =	X	0.00

Large Entity Fee Code (\$)	Small Entity Fee Code (\$)	Fee Description	Fee Paid
1202 18	2202 9	Claims in excess of 20	
1201 86	2201 43	Independent claims in excess of 3	
1203 290	2203 145	Multiple dependent claim, if not paid	
1204 86	2204 43	** Reissue independent claims over original patent	
1205 18	2205 9	** Reissue claims in excess of 20 and over original patent	
<b>SUBTOTAL (2)</b>			<b>(\$)</b> 0.00

\*\*or number previously paid, if greater; For Reissues, see above

**FEE CALCULATION (continued)****3. ADDITIONAL FEES**

Large Entity Small Entity

Fee Code (\$)	Fee Code (\$)	Fee Description	Fee Paid
1051 130	2051 65	Surcharge - late filing fee or oath	
1052 50	2052 25	Surcharge - late provisional filing fee or cover sheet	
1053 130	1053 130	Non-English specification	
1812 2,520	1812 2,520	For filing a request for ex parte reexamination	
1804 920*	1804 920*	Requesting publication of SIR prior to Examiner action	
1805 1,840*	1805 1,840*	Requesting publication of SIR after Examiner action	
1251 110	2251 55	Extension for reply within first month	
1252 420	2252 210	Extension for reply within second month	
1253 950	2253 475	Extension for reply within third month	
1254 1,480	2254 740	Extension for reply within fourth month	
1255 2,010	2255 1,005	Extension for reply within fifth month	
1401 330	2401 165	Notice of Appeal	
1402 330	2402 165	Filing a brief in support of an appeal	
1403 290	2403 145	Request for oral hearing	
1451 1,510	1451 1,510	Petition to institute a public use proceeding	
1452 110	2452 55	Petition to revive - unavoidable	
1453 1,330	2453 665	Petition to revive - unintentional	
1501 1,330	2501 665	Utility issue fee (or reissue)	
1502 480	2502 240	Design issue fee	
1503 640	2503 320	Plant issue fee	
1460 130	1460 130	Petitions to the Commissioner	
1807 50	1807 50	Processing fee under 37 CFR 1.17(q)	
1806 180	1806 180	Submission of Information Disclosure Stmt	
8021 40	8021 40	Recording each patent assignment per property (times number of properties)	
1809 770	2809 385	Filing a submission after final rejection (37 CFR 1.129(a))	
1810 770	2810 385	For each additional invention to be examined (37 CFR 1.129(b))	
1801 770	2801 385	Request for Continued Examination (RCE)	
1802 900	1802 900	Request for expedited examination of a design application	

Other fee (specify)

\*Reduced by Basic Filing Fee Paid

**SUBTOTAL (3)** (\$)  
0.00**SUBMITTED BY**

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**Patent Application Data Sheet**

**Application Information**

Application Type:: Provisional

Subject Matter:: Utility

Suggested

Classification::

Suggested Group Art

Unit::

CD-ROM or CD-R?::

Number of CD disks::

Number of copies of CDs::

Sequence submission?::

Computer Readable

Form (CRF)?::

Number of copies of CRF::

Title:: APPARATUS AND METHODS FOR PROVIDING AN  
UPGRADEABLE MULTI-MONITOR SYSTEM

Attorney Docket Number:: 13772-2

Request for Early

Publication?:: No

Request for Non-Publication?:: No

Suggested Drawing Figure:: 11

Total Drawing Sheets:: 20

Small Entity?:: No

Latin Name::

Variety denomination

name::

Petition included?:: No

Petition Type::

Licensed US Govt.

Agency::

Contract or Grant

Numbers::

Secrecy Order in

Parent Appl.?:: No

### **Applicant Information**

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Primary Citizenship

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### Domestic Priority Information

<b>Application::</b>	<b>Continuity Type::</b>	<b>Parent Application::</b>	<b>Parent Filing Date::</b>
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### Foreign Priority Applications

<b>Country::</b>	<b>Application Number::</b>	<b>Filing Date::</b>	<b>Priority Claim d</b>
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### Assignee Information

Assignee name::  
Street of mailing address::  
City of mailing address::

State or Province of

mailing address::

Country of mailing address::

Postal or Zip Code of

mailing address::



B&P File No. 13772-2

BERESKIN & PARR

UNITED STATES

Title: APPARATUS AND METHODS FOR  
PROVIDING AN UPGRADEABLE  
MULTI-MONITOR SYSTEM

Inventor(s): Jerry Moscovitch

**Title: APPARATUS AND METHODS FOR PROVIDING AN  
UPGRADEABLE MULTI-MONITOR SYSTEM**

**Field of the invention**

**[0001]** The present invention relates to multi-monitor display systems, and more particularly to attachment systems for securing monitors to multi-monitor display systems.

**5   Background of the invention**

**[0002]** Multi-monitor display systems are well known. Such systems provide two or more monitors, often secured to a common base having support members for each monitor. The monitors are generally operatively connected to a computer system, so that a first image may be displayed on a  
10 first monitor, and a second image may be displayed on a second monitor. This arrangement can facilitate activities, such as comparing two documents, which would be more difficult if only a single-monitor were used, particularly where the single-monitor can only effectively display one document at a time. Alternatively, a single image may be spread across two monitors. It is also  
15 known for such monitors to be adapted for removable attachment to the support members.

**[0003]** An exemplary multi-monitor display system is described in U.S. Patent No. 6,343,006 to Moscovitch et al., which is hereby incorporated by reference in its entirety.

20 **[0004]** Typically, the monitors used in multi-monitor display systems are flat-panel monitors. The term "flat-panel" does not refer to the surface of the screen, but to the fact that the monitor has a generally rectangular, tablet-like shape, rather than the generally box-like shape of traditional cathode ray tube (CRT) monitors. Flat-panel monitor types include liquid crystal display (LCD)  
25 plasma screens, organic light emitting diode (OLED) among others. Flat-panel monitors are frequently used in multi-monitor display systems because they are relatively compact and lightweight. Accordingly, it is preferred that flat-panel monitors be used with the present invention. Other display types may also be used.

[0005] One difficulty often faced by a customer making an initial purchase of a multi-monitor display system is whether to purchase a single monitor or a multi-monitor system. A customer may face similar difficulties in choosing between multi-monitor systems (e.g. between a two-monitor and a  
5 three-monitor system). Multi-monitor systems are typically more costly, and the consumer is often uncertain as to whether such a system is needed. If the customer purchases a single-monitor system, however, and then realizes (after any return period has expired) that a multi-monitor system would be advantageous, the customer may have to buy a complete multi-monitor  
10 system, with the monitor from the first, single-monitor system being a wasted expense.

**Summary of the invention**

[0006] It would be desirable to provide an efficient way for a consumer to upgrade from a single to a multi-monitor system.

15 [0007] In one aspect, the present invention is directed to a method of selling monitors suitable for use in a multi-monitor display system, including the step of offering an upgrade system for upgrading an m-screen system including at least m support members each adapted to support a monitor and m monitors each having a bracket disposed thereon, each bracket being  
20 adapted to matingly engage a support member, in which the upgrade system includes n support members each adapted to support a monitor and (n-m) monitors each having a bracket disposed thereon, each bracket being adapted to matingly engage a support member, and where n and m are integers satisfying  $0 < m < n$ .

25 [0008] In another aspect, the present invention is directed to a method of selling monitors suitable for use in a multi-monitor display system, including the step of offering an upgrade system for upgrading an m-screen system including at least m support members each adapted to support a monitor and m monitors each having a bracket disposed thereon, each bracket being  
30 adapted to matingly engage a support member, in which the upgrade system includes (n-m) support members each adapted to support a monitor and (n-m)

monitors each having a bracket disposed thereon, each bracket being adapted to matingly engage a support member, and where  $n$  and  $m$  are integers satisfying  $0 < m < n$ .

5 [0009] In a further aspect, the present invention is directed to a method of selling monitors suitable for use in a multi-monitor display, including the steps of offering a customer an i-screen system, in which the i-screen system includes  $j$  support members each adapted to support a monitor and  $i$  monitors each having a bracket disposed thereon, each bracket being adapted to matingly engage a support member, and offering a customer who has  
10 purchased an i-screen system an upgrade system including  $n$  support members each adapted to support a monitor and  $m$  monitors each having a bracket disposed thereon, each bracket being adapted to matingly engage a support member, in which  $i$ ,  $j$ ,  $m$  and  $n$  are integers satisfying  $0 < i \leq j$ ;  $0 \leq n$ ; and  $0 < m$ .

15 [0010] In yet another aspect, the present invention is directed towards a kit for adapting a monitor for use in a display system having at least one support member for supporting a monitor, where each of the at least one support members has at least one electrical port associated therewith for transmitting at least one of power and video signal to a corresponding  
20 monitor, in which the kit includes a mounting bracket adapted to be secured to a monitor and also adapted to matingly engage a support member, and an electrical connector cable for connecting an electrical port associated with a support member to at least one electrical port on a monitor.

[0011] In a still further aspect, the present invention is directed towards  
25 a method of retrofitting a separate monitor for use in a display system having  $n$  support members each adapted to support a monitor and  $m$  monitors, where  $n$  and  $m$  are integers and  $m$  and  $n$  are greater than zero, in which the method includes the step of securing a mounting bracket to the monitor, the mounting bracket being adapted to matingly engage the at least one support member.

30 [0012] In another aspect, the present invention is directed to a mounting bracket system for modifying a monitor adapted to be mounted to a

first display system having at least one support member of a first type so as to adapt said monitor for mounting to a second display system having at least one support member of a second type, in which the mounting bracket system includes securing means for securing the mounting bracket to a monitor, and  
5 mounting means adapted to matingly engage a support member of the second type.

**[0013]** In yet another aspect, the present invention is directed towards a method of retrofitting a monitor having a first rear facing so as to adapt the monitor for use in a display system having at least one support member, in  
10 which the method includes the steps of removing the first rear facing from the monitor and installing a second rear facing on the monitor where the second rear facing has a mating member disposed on the rear surface thereof and the mating member is adapted to matingly engage the at least one support member.

**[0014]** In a still further aspect, the present invention is directed to a method of upgrading an n-monitor system including n monitors and at least n support members of a first type, each monitor having a mounting bracket of a first type adapted for supporting the monitor on a support member of the first type, to an m-monitor system comprising m monitors and at least m support  
20 members, where n and m are integers satisfying  $0 < n < m$ , in which the method includes providing at least (m-n) support members of a second type unsuitable for supporting a monitor having a mounting bracket of the first type, and providing (m-n) monitors each having a mounting bracket of a second type adapted for supporting the monitor on a support member of the second  
25 type.

**[0015]** In another aspect, the present invention is directed towards an upgrade kit for upgrading an n-monitor system including n monitors and at least n support members of a first type, each monitor having a mounting bracket of a first type adapted for supporting the monitor on a support  
30 member of the first type, to an m-monitor system having m monitors and at least m support members, where n and m are integers satisfying  $0 < n < m$ ,

wherein the kit includes at least (m-n) support members of a second type unsuitable for supporting a monitor having a mounting bracket of the first type; and (m-n) monitors each having a mounting bracket of a second type adapted for supporting the monitor on a support member of the second type.

**5 Brief description of the drawings**

**[0016]** Figure 1 is a perspective, partly exploded view of a multi-monitor display system.

**[0017]** Figure 2 is an exploded perspective view of a bracket used to mount a monitor to a display system, secured to a monitor.

**10 [0018]** Figure 3 is an exploded perspective view of a single-monitor display system showing a support structure, a support member and a support element.

**[0019]** Figure 4 is a side view of a bracket used to mount a monitor to a display system.

**15 [0020]** Figure 5 is a front view of a bracket used to mount a monitor to a display system.

**[0021]** Figure 6 is a top view of a bracket used to mount a monitor to a display system.

**[0022]** Figure 7 is a side cross-sectional view of a bracket used to  
**20** mount a monitor to a display system, taken along the line A-A in Figure 5.

**[0023]** Figure 8 is a bottom view of a bracket used to mount a monitor to a display system.

**[0024]** Figure 9 is a top view of a support element.

**[0025]** Figure 10 is a front view of a support element.

**25 [0026]** Figure 11 shows an initial single-monitor display system, and a dual-monitor system resulting from upgrading the single-monitor system in accordance with the present invention.

**[0027]** Figure 12 is an aspect of a modular support structure.

- [0028] Figure 13 is an arm member for use with a modular support structure.
- [0029] Figure 14 is a modular support structure configured with an arm member to support two monitors.
- 5 [0030] Figure 15 is a modular support structure configured with two arm members to support three monitors.
- [0031] Figure 16 is a modular support structure configured with three arm members to support four monitors.
- [0032] Figure 17 is a top view of a mounting plate for mounting a  
10 monitor to a display system.
- [0033] Figure 18 is a front view of a mounting plate for mounting a monitor to a display system.
- [0034] Figure 19 is a receiving element for receiving a monitor having a mounting plate.
- 15 [0035] Figure 20 is an embodiment of a mounting bracket system according to the present invention.
- [0036] Figure 21 is a side view of a monitor.
- [0037] Figure 22 is a rear view of a monitor.
- [0038] Figure 23 is a top view of a monitor.
- 20 [0039] Figure 24 is a rear view of a monitor.
- [0040] Figure 25 is a rear view of a monitor.
- [0041] Figure 26 is a perspective view of a multi-monitor display system having combined video signal/power cables.
- [0042] Figure 27 is a rear view of a monitor.
- 25 [0043] Figure 28 shows an electrical connector cable.
- [0044] Figure 29 is a perspective view of a multi-monitor display system having separate video signal and power cables.

[0045] Figure 30 shows an electrical connector cable.

[0046] Figure 31 is a rear view of a monitor.

[0047] Figure 32 is a rear view of a first embodiment of a plug element.

[0048] Figure 33 is a side view of a first embodiment of a plug element.

5 [0049] Figure 34 is a rear view of a second embodiment of a plug element.

[0050] Figure 35 is a side view of a second embodiment of a plug element.

10 [0051] Figure 36 is a rear view of a first embodiment of an adaptor member.

[0052] Figure 37 is a rear view of a second embodiment of an adaptor member.

[0053] Figure 38 is a side view of a monitor and a monitor support.

[0054] Figure 39 is a side view of a monitor and a monitor support.

15 **Detailed description of the invention**

[0055] Referring to Figure 1, a multi-monitor system (in this case a two-monitor system) is shown generally at 10. Multi-monitor system 10 comprises a base 12, an upstanding member 14, an arm member 16 and two support members 18 (only one of which is shown) disposed at opposite ends of the arm member 16. The upstanding member 14 may be integral with the base, but is preferably a separate piece secured thereto (e.g. by means of a wing nut). Signal and power cables, or a single integral signal/power cable, may be disposed inside the upstanding member 14 and optionally extend inside the arm member 16, so that the terminals (not shown) emerge adjacent support members 18 for connection to the monitors 22. The multi-monitor system 10 would also include a power supply (e.g. a 12 volt power supply) for providing power to the monitors 22. Alternatively, the monitor may be connected directly to a conventional electrical outlet, with any necessary circuitry required to adapt the voltage being included in the monitor. Each support

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25



member 18 comprises a support element 20 having a socket 28, and is thereby adapted to support one of the monitors 22.

[0056] Now referring to Figures 2 and 4 to 8, each monitor 22 has a bracket 24 disposed thereon. As shown particularly in Figure 2, where the  
5 monitor 22 has a VESA (Video Electronics Standards Association) mounting hole pattern on its rear surface, the bracket 24 may have holes 25 corresponding to this pattern so that the bracket 24 can be mounted to any such monitor 22.

[0057] The bracket 24 has a generally wedge-shaped mating member  
10 26 which is adapted to matingly engage the complementary shaped socket 28 on support element 20 (shown in Figures 1 and 3), and thereby matingly engage support member 18. Each bracket 24 may be secured to a monitor 22 by means of screws, bolts, a suitably strong adhesive, or by any other means known in the art. For example, a bracket 24 may be integrally formed  
15 with the rear surface panel of a monitor 22 (not shown), or it may be secured to a monitor 22 by way of clamping, such as a clamp or clamps frictionally engaging the edges of the monitor 22 (not shown).

[0058] As noted above, the mating member 26 on the bracket 24 is generally wedge-shaped. In particular, with reference to Figures 5, 6 and 8,  
20 the mating member 26 has a wider top portion 31 and a narrower bottom portion 33 (relative to each other). Preferably, as shown in Figures 6 and 8, the mating member 26 is shaped so as to define projections 30 and grooves 32 along its side edges, and the socket 28 has complementary grooves 34 and projections 36 (as shown in Figure 9) to matingly engage the projections  
25 30 and grooves 34, respectively, on mating member 26. To cause the mating member 26 to engage the socket 28, the bottom portion 33 is aligned generally with the top portion 35 of the socket 28, and then slid in a generally downward direction. As the bottom portion 33 of the mating member 26 proceeds downwardly into the socket 28, the projections 30 and grooves 32  
30 on the mating member 26 will engage the complementary grooves 34 and

projections 36 in the socket 28, until the mating member 26 is fully engaged with the socket 28.

[0059] Optionally, as shown in Figures 5 and 7, mating member 26 may have an aperture 38 for engaging a detent 40 on support element 20 (as shown in Figures 9 and 10) so as to maintain bracket 24 (and thereby monitor 22) in a mounted position. (Alternatively, a recess may be used in lieu of the aperture 38). Detent 40 is preferably biased into an engaging position (e.g. by a spring), and has a sloped surface so that it is pushed out of the engagement position as mating member 26 is inserted downwardly into socket 28, and then returns to its engagement position when it is aligned with aperture 38, thereby locking the bracket 24 into engagement with the support element 20. Preferably, a detent lever 42 is operably connected to the detent 40 to allow the detent 40 to be moved out of the engagement position so as permit disengagement of the bracket 24 (and thereby the monitor 22) from support element 20 (and thereby from the support member 18). For further stability, a stop 44 may be provided on the socket 28 to engage a notch 46 on the mating member 26.

[0060] Now referring to Figure 3, a single-monitor system is shown in which there is a support member 18 having a ball and socket pivot arrangement. The particular construction of the ball and socket pivot structure is described in detail in U.S. Patent Number 6,343,006 (which is incorporated by reference herein) and will not be further described. In this embodiment, the support member 18 has a plug element 50 adapted to be friction fit into a receiving recess 52 on upstanding member 14. The friction fit is preferably tight enough that plug element 50 is not easily removed from the receiving recess 52 and can support the weight of a monitor, but not so tight as to prevent removal altogether. Preferably, each plug element 50 has a threaded bore 53 (shown in Figure 32) and is held in place inside the receiving recess 52 by a bolt or screw inserted from the opposite side of upstanding member 14 through an aperture 54 in the receiving recess 52. In such a configuration, when it is desired to remove the plug element 50 from the receiving recess

52, the screw can be removed. It will be appreciated that in a multi-monitor system such as the system 10 shown in Figure 1, multiple receiving recesses 52 would be provided (e.g. at opposite ends of the arm member 16).

[0061] The embodiments described above are exemplary only, and one skilled in the art will recognize that a wide variety of support members, brackets, plug elements and receiving recesses may be used within the scope of the present invention. For example, the use of a "hook and latch" arrangement (described further below) is contemplated within the scope of the present invention. Furthermore, the structure of the plug element 50, and of an alternate embodiment of a plug element, will be described further below.

[0062] As noted above, a customer will typically face an initial choice between an m-monitor system and an n-monitor system, where m and n are integers and  $0 < m < n$ . Because, as described above, the monitors can be removably mounted to a support structure (e.g. by way of bracket 24 and support members 18), it becomes possible to upgrade an m-monitor system to an n-monitor system.

[0063] In a first scenario, a customer may have purchased an m-monitor system, in which the support structure is non-modular (i.e. it is not designed to be expanded upon). (Note that the term "purchased" as used in the specification and claims includes all similar transactions, such as rentals, leases, trades, borrowing, etc., and the term "selling" has a similarly broad connotation.) For example, a customer may have purchased a single-monitor system 100 as shown in Figure 11.

[0064] System 100 comprises support structure 110 having a single support member such as support member 18 (not shown in Figure 11) and a monitor 122, which has a bracket (such as bracket 24) (not shown in Figure 11) adapted to matingly engage the support member. The single-monitor system 100 may also include a power supply (not shown), or the monitor 122 may be directly connected to an electrical outlet. Signal and power cables (not shown), or a single integral signal/power cable (not shown), may be disposed inside the support structure 110.

[0065] The single-monitor system 100 may be upgraded to become a dual-monitor system 200 by providing an upgrade system comprising an additional monitor 222 having a bracket (such as bracket 24) adapted to matingly engage a support member, and a new support structure 210 having  
5 two support members (such as support members 18) each adapted to support a monitor. The new support structure 210 may also have signal and power cables (not shown), or a single integral signal/power cable (not shown) disposed therein. The original support structure 110 may be kept for further use, in which case a new power supply (if necessary) is preferably provided  
10 for the new support structure 210, or the original support structure 110 may be discarded or returned to the manufacturer, in which case the original power supply (if any) may be used in the upgraded system. The original monitor 122 may be mounted (by means of its bracket) on one of the two support members of the new support structure 210, with the new monitor 222 also  
15 mounted thereon (i.e. on the other support member). Where the original support structure 110 is kept for further use, monitors 122 and 222 may be transferred between the two support structures 110 and 210 as desired.

[0066] The method of selling monitors described above may be generalized for any number of monitors in the original and upgraded system  
20 as a method in which a customer begins with an m-monitor system, and the upgrade system comprises (n-m) monitors and n support members, where m and n are integers and  $0 < m < n$ .

[0067] The purchase of an upgrade system that can be integrated with an existing system is more desirable than the purchase of a complete new  
25 system because it is generally less expensive (since fewer monitors need to be purchased). Further financial incentives may also be offered to a customer purchasing an upgrade system. For example, the cost structure can be arranged such that the combined cost of an m-monitor system and an upgrade system for preparing an n-monitor system is substantially equal to  
30 the cost of an n-monitor system.

[0068] In an alternate embodiment, the original system may be modular. For example, with reference to Figure 12, a support structure 310 comprises a base 312 having an upstanding member 314. The upstanding member 314 has a receiving recess 352 adapted to receive a plug element 50 on a support member 18 (as shown in Figure 3). In other words, the receiving recess 352 is identical to the receiving recess 52 shown in Figure 3. Thus, a single support member may be mounted to upstanding member 314 so as to provide a single-monitor system (not shown). Now referring to Figure 13, an arm member 316 can be provided with a plug element 350 (identical to that of the plug element 50 on the support member 18 as shown in Figure 3) to be friction fit into a receiving recess 352. Each arm member 316 is also provided with two receiving recesses 362, which are identical to the receiving recess 352 on the upstanding member 314, and therefore also identical to the receiving recess 52 shown in Figure 3.

[0069] The method described above with respect to a non-modular system is adaptable to upgrade a modular system. For example, a customer could begin with a single-monitor system, so that the support structure 310 simply comprises the base 312 and upstanding member 314, as shown in Figure 12. Plug element 50 on support member 18 (not shown) is inserted into the receiving recess 352 on the upstanding member 314, and a monitor (not shown) is then matingly engaged with the support member. To upgrade to a dual-monitor system, the upgrade system would comprise a second monitor, one arm member 316, and a second support member 18. The plug element 350 on the arm member 316 is friction fit into the receiving recess 352 on the upstanding member 314, as shown in Figure 14, so that two receiving recesses 362 are available. The two support members 18 (one from the original system and one from the upgrade system) (not shown) are friction fit into the receiving recesses 362, and the two monitors (one from the original system and one from the upgrade system) (not shown) are then matingly engaged with the two support members 18, resulting in a dual-monitor system.

**[0070]** Similarly, a single-monitor system could be upgraded to a three-monitor system by providing an upgrade system comprising two arm members 316, two support members 18, and two monitors. Alternately, a dual-monitor system (as described above) could be upgraded to a three-monitor system by providing one arm member 316, one support member 18, and one monitor. The support structure 310 as adapted to a three-monitor system is shown in Figure 15, where three receiving recesses 362 are available for three support members (not shown). Support structure 310 is also adaptable to a four-monitor system, as shown in Figure 16. In fact, where a multi-monitor display system is modular, the method of selling monitors described above may be generalized to include any method in which a customer begins with an m-monitor system, and the upgrade system comprises (n-m) monitors and (n-m) support members, where m and n are integers and  $0 < m < n$ .

**[0071]** Alternatively, in the case of a non-modular support structure in which the support member(s) are nonetheless removable (e.g. by way of plug element 50 and receiving recess 52 shown in Figure 3), the original support structure can be replaced with a new support structure, but the support member(s) from the original system could be reused in the new, upgraded system. (The base from the original support structure, if detachable therefrom, could also be reused as part of the new support structure). Thus, in a system that is non-modular but in which support members from the original support structure are reused with the new support structure, there can be used the same method of selling monitors as was used for modular systems, namely a method in which a customer begins with an m-monitor system, and the upgrade system comprises (n-m) monitors and (n-m) support members, where m and n are integers and  $0 < m < n$ .

**[0072]** Furthermore, both of the above methods of selling monitors may be adapted to the situation where a customer has not yet purchased a display system, and is uncertain whether to buy, for example, a single-monitor or a dual-monitor system, or is having difficulty deciding whether to buy a dual-

monitor system or a three-monitor system. Regardless of the customer's particular situation, according to the method of the present invention, where the customer is trying to decide between an i-screen system, and an (i+m)-screen system, the customer is advised to purchase the i-screen system,

5 wherein the i-screen system comprises j support members each adapted to support a monitor and i monitors each having a bracket disposed thereon, the bracket adapted to matingly engage a support member, where i and j are integers and  $0 < i \leq j$ . Preferably  $i = j$ , but in some cases it may be desired to provide additional (potentially unnecessary) support members with the initial

10 system. For example, the extra support members could be (e.g. temporarily) mounted elsewhere, such as on a wall, and the monitors moved amongst the support members as desired. The customer may be entirely satisfied with this system, and realize that no additional monitors were needed. In such a case, the customer will be pleased that he or she was not pressured to purchase an

15 (i+m)-monitor system. Alternately, the customer may find that i monitors are insufficient, and that it would have been better to have purchased the (i+m)-monitor system. One embodiment of the method of the present invention includes the further step of offering a customer who has purchased an i-screen system an upgrade system comprising n support members each

20 adapted to support a monitor and m monitors each having a bracket disposed on the rear surface thereof adapted to matingly engage a support member, where n and m are integers greater than zero. Thus, in a case where a customer would otherwise be dissatisfied because his or her system does not have enough monitors, the method of the present invention avoids such

25 dissatisfaction by providing an upgrade. Financial incentives may also be provided with this method, for example so that the combined price of the initial i-monitor system and the upgrade system is equal to the price of an (i+m)-monitor system. Again, it may be desirable to provide more support members than monitors. Alternatively, it may in some cases be desirable to provide for

30 a system having more monitors than support members. For example, the additional monitors may be selectively mounted in cars, or it may be desirable to interchange monitors of various sizes amongst the support members.

**[0073]** It will be appreciated that the above methods of selling monitors will be most effective where the brackets and support members in the first system are compatible with those in the upgrade system. Often, however, manufacturers of monitors used in multi-monitor display systems will each  
5 have their own proprietary mounting configuration, and these mounting configurations may not be compatible with one another. This increase the difficulty for a customer who has purchased, for example, a single-monitor system from a first manufacturer and who wishes to upgrade to a dual-monitor system by purchasing an upgrade system from a second manufacturer.

10 **[0074]** As an example, a customer who has purchased a single-monitor system from Manufacturer A wishes to upgrade to a dual-monitor system. In the present example, however, Manufacturer A does not offer an upgrade system as described above, while Manufacturer B does offer such an upgrade system. The monitor from Manufacturer A may be secured to a support  
15 structure by way of screws directly connecting the support structure to the monitor's VESA (or other) mounting hole pattern. Thus, the monitor from Manufacturer A will not have any separate engagement means for attaching to a support structure, and if the monitor is then removed (by unscrewing) from the support structure, the VESA (or other) mounting hole pattern will be  
20 exposed. Alternately, the monitor from Manufacturer A may have engagement means, typically (but not necessarily) on the rear side of the monitor, which allow it to be removably supported on the support structure provided by Manufacturer A, but which are unsuitable for supporting it on a support member provided with the upgrade system offered by Manufacturer  
25 B. For example, now referring to Figures 17 and 18, the engagement means on the monitor from Manufacturer A may comprise a mounting plate 410 having a generally T-shaped engagement member 412. Now referring to Figure 19, the support structure provided by Manufacturer A would include a receiving element 414 having a generally T-shaped receiving channel 416,  
30 corresponding in shape to the T-shaped engagement member 412, with a stop 418 disposed at the bottom of the receiving channel 416. Where the type of support member in the upgrade system provided by Manufacturer B is



that of support member 18 having support element 20 as described with respect to Figures 9 and 10, mounting plate 410 is clearly incompatible therewith. In either case (i.e. where the monitor provided by Manufacturer A has no engagement means or has incompatible engagement means), the customer will be unable to use the monitor from Manufacturer A with an upgrade system from Manufacturer B that was designed to upgrade an initial system offered by Manufacturer B.

[0075] As described above, there may be an initial n-monitor system comprising n monitors and (at least) n support members of a first type (e.g. where the support members have a receiving element such as receiving element 414 described with respect to Figure 19), each of the monitors having a bracket (e.g. such as a mounting plate 410 described with respect to Figures 17 and 18). There is provided a method for upgrading the initial n-monitor system to an m-monitor system (again, n and m are integers and  $0 < n < m$ ). This method does not require the modification of any of the elements of the initial system.

[0076] According to the present invention, the method comprises at least two steps. The first step is that of providing (m-n) support members of a second type, and which are unsuitable for supporting a monitor having a mounting bracket of a first type. For example, a support member 18 having a mounting element 20 as described with respect to Figures 9 and 10 is unsuitable for supporting a monitor having a mounting plate 410 described with respect to Figures 17 and 18. The second step is providing (m-n) monitors each having a mounting bracket of a second type adapted to support the monitor on a support member of the second type. Continuing the same example, bracket 24 described with respect to Figures 2 and Figures 4 to 7 is adapted to support a monitor on a support member 18 having a mounting element 20 as described with respect to Figures 9 and 10. It will be appreciated that the present invention also includes an upgrade kit corresponding to the above-described method. In particular, the upgrade kit will comprise (m-n) support members of a second type, and which are

unsuitable for supporting a monitor having a mounting bracket of a first type, and (m-n) monitors each having a mounting bracket of a second type adapted to support the monitor on a support member of the second type.

5     **[0077]**     Where the initial system is modular, the upgrade kit may include a number of arm members (i.e. such as arm member 316 described with respect to Figure 13) so as to adapt the support structure of the initial system to provide (m-n) additional receiving recesses for the (m-n) additional support members. The plug elements on any arm members and support members will preferably be of the same type as those provided in the initial system, and  
10    therefore interoperable therewith. Optionally, however, the upgrade kit may include adaptor means (described further below) for integrating the support members of the second type with the system of support members of the first type.

15    **[0078]**     Alternatively, and particularly where the initial system is non-modular, the upgrade system may include a complete replacement support structure comprising n support members of the first type, and (m-n) support members of the second type. Thus, the display system would have support members of different types. Only the n monitors from the initial system would be reused. However, no modification to these monitors would be necessary.

20    **[0079]**     It is considered preferable, however, to provide a display system where all of the support members are of the same type. Accordingly, the present invention includes a method of retrofitting a monitor for use in a display system, including the step of securing a mounting bracket adapted to  
25    matingly engage a support member of a particular type (e.g. support member 18) to the monitor. Typically, but not necessarily, the mounting bracket will be secured to the rear of the monitor. This can be done by way of screws, bolts, adhesive, clamping to an edge or edges of the monitor, or any other suitable means.

30    **[0080]**     Where the monitor to be retrofitted does not include any engagement means (other than a mounting hole pattern, whether VESA or otherwise) the method simply comprises the step of securing a mounting

bracket to the monitor, the mounting bracket being adapted to matingly engage a support member. Preferably the mounting bracket is a bracket 24 as described above with respect to Figures 2 and 4 to 8, and the support member it is adapted to engage is a support member 18 having a support element 20, as described above with respect to Figures 9 and 10.

**[0081]** In another aspect, the method further comprises the step of removing the engagement means from the monitor provided by Manufacturer A before securing the new mounting bracket thereto, if it is necessary (and feasible) to do so. For example, where the monitor provided by Manufacturer A has engagement means such as a mounting plate (e.g. mounting plate 410 shown in Figures 17 and 18) screwed to the monitor's VESA (or other) mounting hole pattern, the mounting plate would be unscrewed and removed, and the mounting bracket could then be screwed into the VESA (or other) mounting hole pattern. The mounting bracket is of course different from the engagement means, in that the engagement means would not permit the monitor to be mounted on a support member provided by Manufacturer B, while the new mounting bracket will permit such mounting. Again, the mounting bracket is preferably a bracket 24 as described above with respect to Figures 2 and 4 to 8, and the support member is a support member 18 having a support element 20, as described above with respect to Figures 9 and 10.

**[0082]** In some cases, the monitor may have no engagement means at all. For example, the monitor may have an integral stand, or it may be desired to adapt a laptop (or laptop screen) or tablet computer for mounting to a display system (assuming the appropriate electrical connections can be made). In this case, a mounting bracket may be secured to the monitor by way of adhesive. Alternatively, a mounting bracket may be secured to a laptop or tablet computer or monitor by way of a clamp (i.e. to frictionally engage the edge or edges of the monitor), or may provide a support on or within which the bottom edge of the monitor may rest. An additional option is to provide a laptop or tablet computer with a removable mounting bracket (of

the same type as the mounting bracket 24 described above). Such a bracket could be easily removed and installed on the laptop or tablet computer, for example by providing a recess on the back of the (e.g.) laptop screen into which the bracket fits. The bracket could be retained in position by, for example, a bayonet-type rotational locking mechanism, or by some other locking means.

**[0083]** While the method has been described with respect to an upgrade from a single-monitor system to a dual-monitor system, it will be appreciated by one skilled in the art that the above method can be used to retrofit a separate monitor for use in a display system having  $n$  support members each adapted to support a monitor and  $m$  monitors, where  $m$  and  $n$  are integers and both  $m$  and  $n$  are greater than zero.

**[0084]** The method described above permits a monitor that was adapted to be mounted to a first display system having support member(s) of a first type to be modified so that it will be suitable for mounting to a second display system having support member(s) of a second type. The present invention also provides a mounting bracket system for such a purpose.

**[0085]** The mounting bracket system of the present invention includes securing means for securing the mounting bracket to a monitor, and mounting means adapted to matingly engage a support member of the second type. In one embodiment, where the monitor to be retrofit has no engagement means other than the VESA (or other) mounting hole pattern (if any), a mounting bracket 24 as described above with reference to Figures 4 to 8 is used, so that the mounting means is mating member 26 and the support member of the second type is support member 18 having support element 20 as described with respect to Figures 9 and 10. The securing means may then be screws, bolts, adhesives, or any other suitable means.

**[0086]** Alternatively, where the monitor to be retrofit includes engagement means adapted to matingly engage a support member of the first type, the securing means may comprise means for matingly engaging the engagement means on the monitor. For example, the engagement means on

the monitor may comprise a mounting plate 410 having a generally T-shaped engagement member 412 as described above with respect to Figures 17 and 18. Again, as above, the support member of the first type would then comprise a receiving element 414 having a generally T-shaped receiving channel 416, corresponding in shape to the T-shaped engagement member 412, with a stop 418 disposed at the bottom of the receiving channel 416. Thus, the engagement means (namely the mounting plate 410 with the engagement member 412) is adapted to matingly engage a support member of a first type (which comprises a correspondingly shaped receiving channel 416). (As can be seen, where the support member of the second type is support member 18 having support element 20 as described with respect to Figures 9 and 10, the engagement means in the form of mounting plate 410 are incompatible therewith.)

**[0087]** For a number of reasons, it may be impractical to remove the engagement means from a monitor. The engagement means may be integral with the rear facing of the monitor, or may be glued thereto so that it cannot be removed without damaging the monitor. In any situation where it is undesirable or infeasible to remove the engagement means from the monitor, the securing means of the mounting bracket system may comprise means for matingly engaging the engagement means on the monitor. For example, where the engagement means comprises a mounting plate 410 and T-shaped engagement member 412, the securing means would be adapted to matingly engage the T-shaped engagement member 412. Now referring to Figure 20, mounting bracket system 424 has mounting means, namely generally wedge-shaped mating member 426, and also has securing means 430. Securing means 430 comprises securing element 432, which defines a generally T-shaped channel 434 for receiving the T-shaped engagement member on the monitor (not shown in Figure 20). A stop 436 is also provided. Thus, the securing means is adapted to matingly engage the engagement means on the monitor. The wedge-shaped mating member 426 is preferably substantially identical to the wedge shaped mating member 26 described with respect to Figures 4 to 8, so that the mounting means is thereby adapted to matingly

engage a support member of the second type, when the support member of the second type is a support member 18 having a support element 20 as described with respect to Figures 9 and 10.

5 [0088] One skilled in the art will recognize that the embodiments described above are exemplary only, and that any number of engagement means, mounting means, securing means and combinations thereof will fall within the scope of the present invention.

10 [0089] Some single and multi-monitor display systems provide monitors having a single electrical port for receiving both power and video signal. Such monitors are offered, for example, by Mass Engineered Design, Inc., located at 474 Wellington Street West, Toronto, Ontario, Canada M5V 1E3. Now referring to Figure 27, such a monitor is shown generally at 450. The monitor 450 has a single electrical port 452 for receiving both power and video signal, and also has a mounting bracket 454, which is identical to bracket 24  
15 described with respect to Figures 4 to 8.

[0090] As stated above, it is also known to provide support structures for single or multi-monitor displays in which signal and power cable(s) are associated with a support member (for example by disposing the cable(s) inside a hollow support structure so that they emerge adjacent a support  
20 member for supporting a monitor). Where the monitors to be used with a particular support structure have a single electrical port for receiving both power and video signal (such as those provided by Mass Engineered Design, Inc.), a single combined video signal/power cable may be used for each monitor. Such a cable would terminate at one end in a single connector  
25 element for connecting to the single port on the monitor, and at a second end in a separate video signal connection element and power connection element for connection to a computer system and a power supply, respectively. Mass Engineered Design, Inc. offers such cables in association with its monitors. Now referring to Figure 26, a support structure for a multi-monitor display  
30 system is indicated generally at 460. The support structure 460 has two support members 18 (only one of which is shown) and is designed for use

with monitors 450 having a single electrical port 452 for receiving both power and video signal. Accordingly, the support structure 460 has disposed therewithin two combined video signal/power cables 462 (again, only one is shown). A first end 464 of the combined video signal/power cable 462  
5 emerges adjacent a support member 18, and is adapted by means of a connector element 466 to transmittingly engage a single electrical port 452 on a monitor 450 so as to transmit both an electrical power supply and a video signal to that monitor 450. A second end 468 of combined video signal/power cable 462 emerges adjacent the base 470 of the support structure 460, and is  
10 adapted to transmittingly engage both a video signal output port on a computer (by way of the signal connector 472) and the output of a power supply (by way of the power connector 474). The power supply may be integral with the computer system, or may be a separate unit.

[0091] In some cases, it is sought to upgrade a display system  
15 incorporating monitor(s) having separate video signal input and power input ports, (such as the monitor 522 described below with respect to Figure 22) using additional monitors having a single electrical port for receiving both power and video signal (such as the monitor 450 described above with respect to Figure 27), or vice versa. In either case, where the support  
20 structure for the display system has signal and power cable(s) (whether combined or separate, as the case may be) that are associated with the support members, there will be an incompatibility between the monitors sought to be added, and the cabling in the existing display system. In particular, if the existing display system has cabling for dual port (i.e. separate  
25 signal and power ports) monitors, it will be incompatible with single port (i.e. for both signal and power) monitors. Conversely, if the existing display system has cabling for single port monitors, it will be incompatible with dual port monitors. While the method and mounting bracket system described above will permit various types of monitors to be physically mounted on  
30 various display systems for which they were not originally designed, where the cabling is incompatible with the monitor ports, the electrical connections may pose a difficulty. While it may be possible to connect the monitors

directly to the computer system and power supply using cables that are independent of the support structure, this results in an unattractive appearance, as the cables will no longer be concealed within the support structure, and there may also be a visible "loose end" of a cable included with  
5 the support structure.

**[0092]** Accordingly, the present invention also provides a kit for adapting a monitor for use in a display system having at least one support member for supporting a monitor where each support has at least one electrical port associated therewith for transmitting at least one of power and  
10 video signal to a corresponding monitor. In particular, the kit comprises a mounting bracket arrangement (such as mounting bracket system 424 as described with respect to Figure 20, or a bracket 24 as described with respect to Figures 4 to 8), and an electrical connector cable for connecting the at least  
15 one electrical port associated with the support member to at least one electrical port on a monitor. Preferably, the mounting bracket has a generally wedge-shaped mating member such as the mating member 26 on the bracket 24 described with respect to Figures 2 and 4 to 8.

**[0093]** In one embodiment, the electrical connector cable included with the kit is adapted to connect a monitor having separate electrical ports for  
20 power and video signal to a single electrical port for transmitting both power and video signal. Now referring to Figure 26, support member 18 on support structure 460 has an associated single electrical port, in the form of connector element 466, for transmitting both power and video signal. As noted above, such a port is incompatible with a dual-port monitor. With reference to Figure  
25 28, a first embodiment of an electrical connector cable for use in the kit of the present invention is shown generally at 480. The first embodiment of the electrical connector cable 480 is adapted at a first end 482 to transmittingly engage the single electrical port associated with the support member (i.e. connector element 466 in Figure 26) by means of a corresponding single  
30 connector element 484. At its second end 486, the electrical connector cable 480 is adapted to transmittingly engage both a video signal port on a monitor



(by means of a video signal connection element 488) and a power supply port on a monitor (by means of a power connection element 490).

**[0094]** In a second embodiment, the electrical connector cable included with the kit is adapted to connect a monitor having a single electrical port for receiving both power and video signal to two separate electrical ports, one for transmitting power and one for transmitting video signal. Now referring to Figure 29, support structure 492 has two support members 18 (only one of which is shown). Each support member 18 has two electrical ports associated therewith, a first electrical port (a power connection element 494) for transmitting power to a monitor, and a second electrical port (in the form of a video signal connector element 496) for transmitting video signal to a monitor. In Figure 30, a second embodiment of an electrical connector cable for use with the kit is shown generally at 498. The second embodiment of the electrical connector cable is adapted at a first end 500 (by way of single connector element 502) to transmittingly engage a single electrical port on a monitor (such as the port 452 on the monitor 450 described with respect to Figure 27). The second embodiment of an electrical connector cable 298 is adapted at a second end 504 to transmittingly engage the first electrical port (by way of a video signal connection element 506) and the second electrical port (by way of a power connection element 508) associated with the at least one support member.

**[0095]** It will be appreciated by one skilled in the art that whether the single connector element 484, 502, the video signal connection element 488, 506, and the power connection element 490, 508 are male or female will be determined by whether the port to which they are to be connected is male or female. Similarly, the particular type of ports used will be selected based on the ports associated with the support structure and present on the monitor(s) to be connected. Accordingly, there are numerous possible variations on the two basic embodiments described above, depending on the particular types of ports and connector elements used, and all such variations are intended to be included within the scope of the present invention. It is within the

contemplation of the inventor that there may be numerous particular methods by which an electrical connector cable may be configured to transmit or receive separate video signal and power supply inputs at one end and receive or transmit both signals through a single electrical port at the other end.

- 5   **[0096]**       As noted above, it is possible that a monitor may have a rear facing having engagement means that are integral or otherwise substantially non-removable. The method above provides for securing a mounting bracket to the monitor, and the associated mounting bracket system may comprise securing means for matingly engaging the engagement means on the
- 10   monitor. An alternate method for retrofitting a monitor so as to adapt it for use in a display system having at least one support member is now described. This method is suitable for use with a monitor having engagement means disposed on the rear facing wherein the engagement means are integral with or otherwise substantially non-removable from the rear facing.
- 15   **[0097]**       Now referring to Figures 21 to 23, a monitor comprising a front (i.e. screen side) facing 510 and a first rear facing 512 is indicated generally at 522. The first rear facing 512 is secured to the front facing 510 by means of screws 514. The first rear facing 512 has apertures 515 and 516 defined therein, in order to render the video signal port 517 and the electrical power
- 20   supply port 518 accessible for connecting signal and power supply cables (not shown) to the monitor 522. An engagement means, which in this case comprises a generally T-shaped engagement member 523, is integrally formed with the first rear facing 512 of monitor 522. The T-shaped engagement member 523 is adapted for mating engagement with a receiving
- 25   element such as a receiving element 414 having a generally T-shaped receiving channel 416 as described in relation to Figure 19. Accordingly, the T-shaped engagement means is unsuitable for use with a support member having a support element 20 of the type described with respect to Figures 8 and 9. Because the T-shaped engagement member 523 is integral with the
- 30   first rear facing 512, it cannot be easily removed.

[0098] In a method according to the present invention, the first rear facing 512 is removed from the monitor 522, in the present example by unscrewing the screws 514 and then lifting the first rear facing 512 away from the monitor 522. A second rear facing 525 having a mounting bracket 524 on its outer surface is then installed on the monitor 522, as shown in Figure 24. The mounting bracket 524 is preferably the bracket 24 described above with respect to Figures 2 and 4 to 8, and is therefore adapted to matingly engage a support member having a support element of the type described with respect to Figures 8 and 9. Mounting bracket 524 may be secured to the second rear facing 525 by way of screws 526, or (not shown) by a suitably strong adhesive. In a preferred embodiment, the second rear facing 525 has a VESA mounting hole pattern defined thereon, and the mounting bracket 524 is secured thereto by screws 526. Alternately, as shown in Figure 25, a second rear facing 527 may be provided with an integral mating member 528 that is substantially identical to the mating member 26 described above.

[0099] As was described above, it is possible that there may be an incompatibility between the cabling provided in a support structure for a display system, and the video signal and power port(s) on a monitor sought to be integrated with the display system (such as where each support member in the display system has a single electrical port and the monitor is a dual port monitor, or vice versa). One solution is to provide an adaptor kit including an electrical connector cable (such as the electrical connector cables 480, 498 described with respect to Figures 28 and 30, respectively). Alternately, where the first rear facing of a monitor is to be removed and replaced by a second rear facing, as in the above method, the method may comprise additional steps to adapt the monitor for use with a display system with which its power and video signal port(s) would otherwise be incompatible.

[00100] As shown in Figure 22, the rear facing 512 of the monitor 522 defines two apertures 515 and 516 for exposing two separate electrical ports, namely the video signal port 517 and the electrical power supply port 518. It is also possible that a rear facing may define a single aperture exposing both

electrical ports (not shown). The monitor 522 has power receiving circuitry and video signal receiving circuitry (not shown). The electrical power supply port is connected to the power receiving circuitry for transmitting power to the monitor 522, and the video signal port 517 is connected to the video signal receiving circuitry for transmitting video signal to the monitor 522. Where the support structure with which the monitor 522 is to be integrated provides only a single electrical port, the monitor 522 cannot be directly connected thereto.

**[00101]** In such a case, the method described above may further comprise the step, before installing the second rear facing on the monitor 522, of connecting the power receiving circuitry and video signal receiving circuitry to a single combined electrical port so that both power and video signal may be transmitted to the power receiving circuitry and video signal receiving circuitry, respectively, by means of the single combined electrical port. This process may be as simple as, for example, connecting an electrical connector cable, such as a shortened version of electrical connector cable 480 described with respect to Figure 28, to the video signal port 517 and electrical power supply port 518. Now referring to Figure 31, a monitor 522 is shown with a second rear facing 530 secured thereto. A mounting bracket 524 is secured thereto by screws 526. Prior to attaching the second rear facing 530 to the monitor 522, an electrical connector cable 532 (shown in relief) was installed. In particular, the electrical connector cable 532 has a video signal connector element 534, which was connected to the video signal port 517 on the monitor 522, and a power connection element 536, which was connected to the electrical power supply port 518 on the monitor 522. The second rear facing 530 has an aperture 538 adapted to expose only a single combined electrical port for receiving both power and video signal. The electrical connector cable terminates in a single combined electrical port 540 adapted for receiving both power and video signal, and this single combined electrical port 540 is arranged to be accessible via the aperture 538 in the second rear facing 530. The second rear facing 530 may be secured to the monitor 522 once the electrical connector cable 532 has been installed. The second rear

facing 530 may be shaped to accommodate the additional space occupied by the connector cable 532 when installed.

5 **[00102]** One skilled in the art will appreciate that various other ways of connecting the power receiving circuitry and video signal receiving circuitry to a single combined electrical port are intended to be included within the scope of the present invention. It may similarly be possible to adapt a single-port monitor connecting the power and video signal receiving circuitry to separate power and video signal ports.

10 **[00103]** Referring again to Figure 3, it will be recalled that support member 18 has a plug element 50 adapted to be received within a correspondingly shaped receiving recess 52. Thus, support member 18 could be removably mounted to a support structure, so that it could be removed and a different support member installed in its place. This would permit a support member of a first type (i.e. adapted to support a monitor having a mounting  
15 bracket of a first type) to be replaced with a support member of a second type (i.e. adapted to support a monitor having a mounting bracket of a second type). Replacing support members in this way could avoid the need for modifications to the monitors themselves (at least where the support members are easily removable). However, different manufacturers of display  
20 systems may have different (i.e. proprietary) means for mounting their respective support members to their associated support structures, and the means used by one manufacturer may not be compatible with those of another manufacturer.

25 **[00104]** For example, the plug element 50 shown in greater detail in Figures 32 and 33 has a generally frusto-conical shape, with rectangular stabilizing members 602 disposed at 90 degree intervals about the exterior surface. A threaded bore 53 is provided at the center of the plug element 50, as described above. In contrast, now referring to Figures 34 and 35, an alternate plug element 610 has a generally (slight) frusto-pyramidal shape,  
30 with smoothed edges, and also has a threaded bore 612 defined therein. As can be seen by reference to Figures 32 to 35, a receiving recess shaped to

receive a plug element 50 will not accommodate an alternate plug element 610, and vice versa. Thus, if Manufacturer C secures support members to a support structure by means of plug element 50, and Manufacturer D secures support elements to a support structure by means of alternate plug element 610, it will not be possible to integrate support elements provided by Manufacturer D with the support structure of a display system provided by Manufacturer C.

[00105] Particularly where a support structure is modular, such as that described with respect to Figures 12 to 16, it is desirable to provide for the interchangeability of support members having different types of plug elements. Accordingly, the present invention provides for an adaptor for integrating support members of a first type with support members of a second type. With reference now to Figures 36 and 37, an adaptor member 650 may have a first end 660 having a first receiving recess 662 shaped to accommodate a first type of plug element (in this case plug element 50), and a second end (not shown) comprises a second type of plug element (in this case plug element 610). Thus, adaptor member 650 will permit a support member having a plug element 50 (Figures 3, 32 and 33) to be integrated with a support structure having receiving recesses designed to accommodate a plug element 610 (Figures 34 and 35). Conversely, adaptor member 665 has a first end 670 having a second receiving recess 672 shaped to accommodate a second type of plug element (in this case plug element 610), and a second end (not shown) comprises a first type of plug element (in this case plug element 50). Thus, adaptor member 665 will permit a support member having a plug element 610 (Figures 34 and 35) to be integrated with a support structure having receiving recesses designed to accommodate a plug element 50 (Figures 3, 32 and 33). In order to secure the relevant plug element within the receiving recess 662, 672, each adaptor member 650, 665 is provided at its first end 660, 670 with four set-screws 664, 674, respectively.

[00106] Three basic examples of embodiments of the invention are provided as follows.

**[00107]** In Examples 1 and 2, a user begins with a single monitor system comprised of the following components: a Mass Engineered Design, Inc. 15 inch or any other size monitor having a proprietary signal/power connector, a column with an integrated signal/power cable and a quick release mounting system (for the monitor), a base which bolts to the column with a single wing nut, and an external +12 volt power supply.

**[00108]** In Example 1, the user is supplied a second Mass Engineered Design, Inc. 15 inch or any other size monitor, a replacement column, and a dual arm which has a dual integrated signal/power cable installed and one quick release assembly. The quick release assembly, base and power supply are reused from the original single monitor purchase, creating a dual monitor system.

**[00109]** In Example 2, the user is supplied with a second Mass Engineered Design, Inc. 15 inch or any other size monitor and complete dual monitor stand including quick release assemblies, power supply and base. This allows the user to operate the single monitor by transferring a monitor between the dual and single stands.

**[00110]** Example 3: The Mass Engineered Design, Inc. stand or structure utilizes a quick release assembly for ease of monitor mounting. By supplying an adaptor plate that interfaces between a monitor's VESA mounting hole pattern and the Mass Engineered Design, Inc. quick release assembly, any manufacturer's monitor could be used in the systems described above. This would allow a user to use a previously purchased monitor with the Mass Engineered Design, Inc. stand, creating a hybrid multi-screen system.

**[00111]** As was noted above, another means for securing a monitor is "hook and latch" means. Referring now to Figures 38 and 39, a monitor support 1018 and a monitor 1022 are shown. The monitor 1022 has a hook member 1024 disposed adjacent its rear surface. The hook member 1024 is adapted to pivot about the upper portion 1026 of the monitor support 1018.

The monitor support 1018 also has a latch 1028 to assist in retaining the monitor in a vertical position.

[00112] In operation, a monitor 1022 is positioned so that the hook member 1024 rests on the upper portion 1026 of the monitor support 1018, as  
5 shown in Figure 38. The monitor 1022 is then pivoted downward into a vertical position, as shown in Figure 39. The latch 1028 is then moved into a retaining position (also shown in Figure 39), for example by rotating the latch by way of knob 1030. Other types of fastening means could also be used.

[00113] It is envisioned that the various methods and structures  
10 described above may be adapted for use with systems enabling automatic electrical connection of a monitor, without departing from the scope of the present invention. For example, it is within the contemplation of the inventor that mating members (similar to the mating member 24 described above with respect to Figures 2 and 4 to 8) and correspondingly shaped sockets (similar  
15 to the socket 28 described above) may each be equipped with electrical contacts, so that a monitor will automatically receive electrical communication (i.e. video signal from a computer and electrical power from a power supply) upon mating engagement of the mating member with the socket.

[00114] In another example, referring to Figures 38 and 39, a monitor  
20 1022 may have one or more electrical contact elements 1032 (shown in relief), and the monitor support 1018 may have one or more corresponding electrical contact elements 1034. Accordingly, when the monitor 1022 is moved into the vertical position shown in Figure 39, it will automatically be in electrical communication with the relevant computer system and power supply  
25 (if any).

[00115] It will be appreciated by one skilled in the art that numerous variations and modifications may be made to the embodiments and methods described above without departing from the scope of the present invention, and all such variations and modifications are intended to be encompassed  
30 within the scope of the present invention as defined by the appended claims.



**Claims:**

1. A method of selling monitors suitable for use in a multi-monitor display system, the method comprising the step of offering an upgrade system for upgrading an m-screen system that includes
  - 5 (a) at least m support members each adapted to support a monitor; and
  - (b) m monitors each having a bracket disposed thereon, each bracket adapted to matingly engage a support member;the upgrade system comprising
  - (i) n support members each adapted to support a monitor; and
  - 10 (ii) (n-m) monitors each having a bracket disposed thereon, each bracket adapted to matingly engage a support member;wherein n and m are integers satisfying  $0 < m < n$ .
2. The method of claim 1 wherein  $n = 2$  and  $m = 1$ .
3. A method of selling monitors suitable for use in a multi-monitor display system, the method comprising the step of offering an upgrade system for upgrading an m-screen system comprising
  - 15 (a) at least m support members each adapted to support a monitor; and
  - (b) m monitors each having a bracket disposed thereon, each bracket adapted to matingly engage a support member,the upgrade system comprising
  - 20 (i) (n-m) support members each adapted to support a monitor; and
  - (ii) (n-m) monitors each having a bracket disposed thereon, each bracket adapted to matingly engage a support member;

wherein  $n$  and  $m$  are integers satisfying  $0 < m < n$ .

4. The method of claim 3 wherein  $n = 2$  and  $m = 1$ .

5. A method of selling monitors suitable for use in a multi-monitor display, the method comprising:

5 (a) offering a customer an i-screen system, wherein the i-screen system comprises  $j$  support members each adapted to support a monitor and  $i$  monitors each having a bracket disposed thereon, each bracket adapted to matingly engage a support member; and

10 (b) offering a customer who has purchased an i-screen system an upgrade system comprising  $n$  support members each adapted to support a monitor and  $m$  monitors each having a bracket disposed thereon, each bracket adapted to matingly engage a support member;

wherein  $i$ ,  $j$ ,  $m$  and  $n$  are integers satisfying  $0 < i \leq j$ ;  $0 \leq n$ ; and  $0 < m$ .

6. The method of claim 5 wherein  $i = j$ .

15 7. A kit for adapting a monitor for use in a display system having at least one support member for supporting a monitor, each at least one support member having at least one electrical port associated therewith for transmitting at least one of power and video signal to a corresponding monitor, the kit comprising

20 (a) a mounting bracket adapted to be secured to a monitor and adapted to matingly engage one of the at least one support member; and

(b) an electrical connector cable for connecting one of the at least one electrical port associated with one of the at least one support member to at least one electrical port on a monitor.

25 8. The kit of claim 7 wherein the at least one electrical port associated with each at least one support member is a single electrical port for

transmitting both power and video signal to a corresponding monitor, and the electrical connector cable is adapted at a first end to transmittingly engage the single electrical port, and adapted at a second end to transmittingly engage both a video signal port and a power supply port on the monitor.

- 5 9. The kit of claim 7 wherein the at least one electrical port associated with each at least one support member is a first electrical port for transmitting power to a monitor and a second electrical port for transmitting video signal to a monitor, and the electrical connector cable is adapted at a first end to transmittingly engage a single electrical port on the monitor, the single  
10 electrical port for receiving both power and video signal, and adapted at a second end to transmittingly engage both the first and second electrical ports associated with the at least one support member.
- 15 10. The kit of claim 7 wherein the mounting bracket has a generally wedge-shaped mating member and the support member has a correspondingly shaped socket for receiving the mating member.
- 20 11. A method of retrofitting a separate monitor for use in a display system having  $n$  support members each adapted to support a monitor and  $m$  monitors, where  $n$  and  $m$  are integers satisfying  $0 < m$  and  $0 < n$ , comprising the step of securing a mounting bracket to the monitor, the mounting bracket adapted to matingly engage the at least one support member.
- 25 12. The method of claim 11 wherein the monitor has engagement means disposed thereon, the method further comprising the step of removing the engagement means from the monitor before securing the mounting bracket thereto, and wherein the mounting bracket is different from the engagement means.
13. The method of claim 12 wherein the engagement means is unsuitable for supporting the monitor on said at least one support member.

14. The method of claim 11, 12 or 13 wherein the first mounting bracket has a generally wedge-shaped mating member and the support member has a correspondingly shaped socket for receiving the mating member.

5 15. A mounting bracket system for modifying a monitor adapted to be mounted to a first display system having at least one support member of a first type so as to adapt said monitor for mounting to a second display system having at least one support member of a second type, the mounting bracket system comprising:

(a) securing means for securing the mounting bracket to a monitor; and

10 (b) mounting means adapted to matingly engage a support member of the second type.

15 16. The mounting bracket system of claim 15 wherein the monitor has engagement means adapted to matingly engage a support member of the first type, and the securing means comprise means for matingly engaging the engagement means on the monitor.

17. The mounting bracket system of claim 15 or 16 wherein the mounting bracket has a generally wedge-shaped mating member and the support member has a correspondingly shaped socket for receiving the mating member.

20 18. A method of retrofitting a monitor having a first rear facing to adapt the monitor for use in a display system having at least one support member, comprising the steps of:

(a) removing the first rear facing from the monitor; and

25 (b) installing a second rear facing on the monitor, the second rear facing having a mating member disposed on the rear surface thereof, the mating member adapted to matingly engage the at least one support member.

19. The method of claim 18 wherein the first rear facing has engagement means disposed on the rear surface thereof, and wherein the engagement means is different from the mating member.
20. The method of claim 19 wherein the engagement means is unsuitable  
5 for supporting the monitor on the at least one support member.
21. The method of claim 18 wherein the monitor has power receiving circuitry and video signal receiving circuitry and has two separate electrical ports, one connected to the power receiving circuitry for transmitting power to the monitor and one connected to the video signal receiving circuitry for  
10 transmitting video signal to the monitor, and wherein the first rear facing defines at least one aperture for exposing the electrical ports, and wherein the second rear facing has an aperture adapted to expose only a single combined electrical port for receiving both power and video signal, the method further comprising the step of:
- 15 (c) connecting the power receiving circuitry and video signal receiving circuitry to a single combined electrical port so that both power and video signal may be transmitted to the power receiving circuitry and video signal receiving circuitry, respectively, by means of the single combined electrical port.
22. A method of upgrading an n-monitor system comprising n monitors and  
20 at least n support members of a first type, each monitor having a mounting bracket of a first type adapted for supporting the monitor on a support member of the first type, to an m-monitor system comprising m monitors and at least m support members, where n and m are integers satisfying  $0 < n < m$ , the method comprising:
- 25 (a) providing at least (m-n) support members of a second type unsuitable for supporting a monitor having a mounting bracket of the first type; and
- (b) providing (m-n) monitors each having a mounting bracket of a second type adapted for supporting the monitor on a support member of the second type.

23. The method of claim 22 wherein the support members of the second type are adapted to be integrated with the system of support members of the first type.
24. The method of claim 22 wherein the mounting brackets of the second type each have a generally wedge-shaped mating member and the support members of the second type each have a correspondingly shaped socket for receiving a mating member.
25. The method of claim 22 wherein the mounting brackets of the first type each have a generally wedge-shaped mating member and the support members of the first type each have a correspondingly shaped socket for receiving a mating member.
26. An upgrade kit for upgrading an n-monitor system comprising n monitors and at least n support members of a first type, each monitor having a mounting bracket of a first type adapted for supporting the monitor on a support member of the first type, to an m-monitor system comprising m monitors and at least m support members, where n and m are integers satisfying  $0 < n < m$ , the kit comprising:
- (a) at least (m-n) support members of a second type unsuitable for supporting a monitor having a mounting bracket of the first type; and
  - (b) (m-n) monitors each having a mounting bracket of a second type adapted for supporting the monitor on a support member of the second type.
27. The kit of claim 26 wherein the support members of the second type are adapted to be integrated with the system of support members of the first type.
28. The kit of claim 26 further comprising adaptor means for integrating the support members of the second type with the system of support members of the first type.

29. The kit of claim 26 wherein the mounting brackets of the second type each have a generally wedge-shaped mating member and the support members of the second type each have a correspondingly shaped socket for receiving a mating member.

- 5 30. The kit of claim 26 wherein the mounting brackets of the first type each have a generally wedge-shaped mating member and the support members of the first type each have a correspondingly shaped socket for receiving a mating member.

### **ABSTRACT OF THE DISCLOSURE**

Monitors are sold by offering upgrade systems having additional monitors and supports to customers who have already purchased display systems. The additional monitors and supports can have the same mounting structure as the existing system, or a different mounting structure. A

5 customer can choose between systems having more or fewer monitors, and the system can later be upgraded to provide additional monitors. An upgrade kit includes a mounting bracket to enable a monitor to be mounted to a multi-monitor display system, and an electrical connector cable for connecting the monitor to a computer and power supply. A monitor can be retrofit by

10 securing a mounting bracket directly to the monitor or to an existing mounting structure on the monitor. Alternately, the monitor can be retrofit by removing its rear facing and replacing it with a new rear facing having the desired mounting structure.



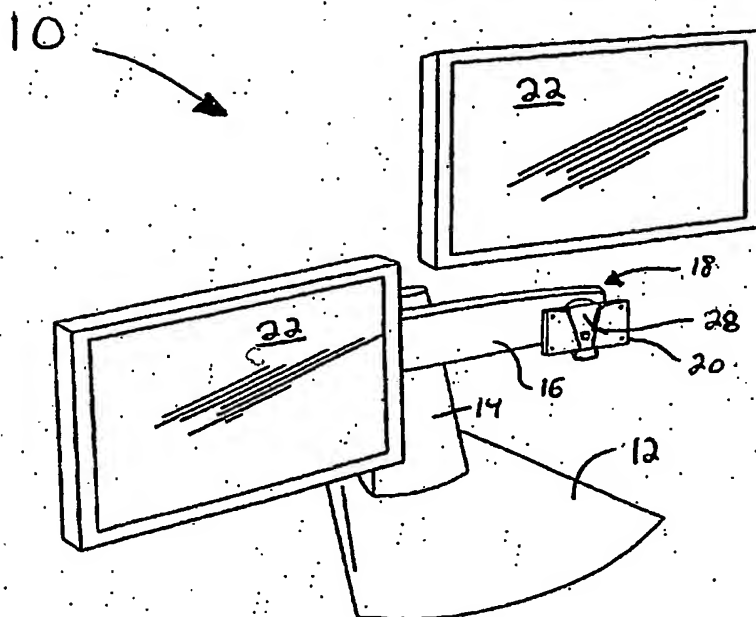


Figure 1

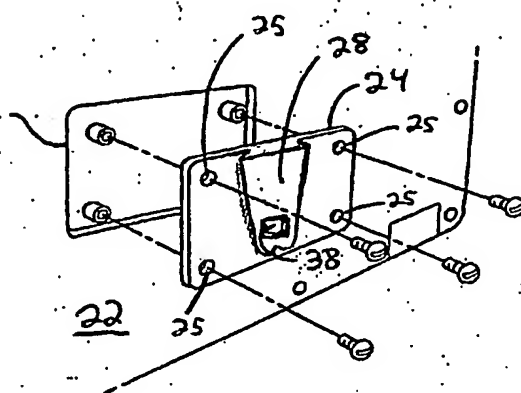


Figure 2

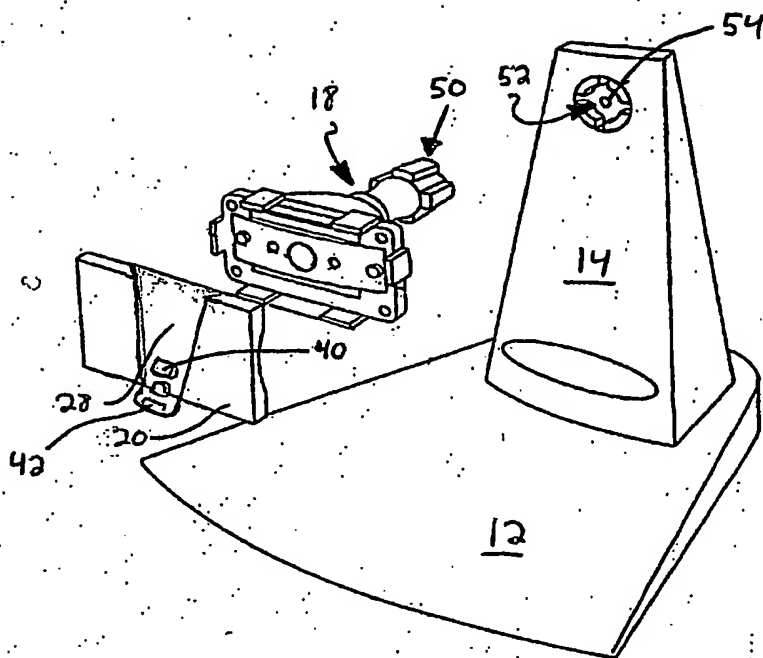


Figure 3

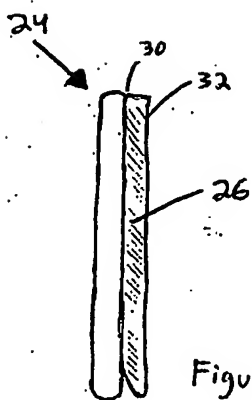


Figure 4

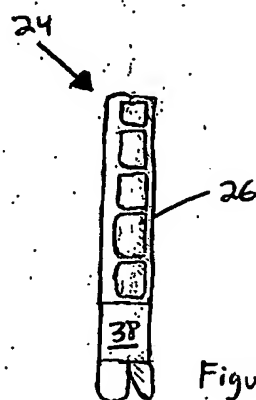


Figure 7

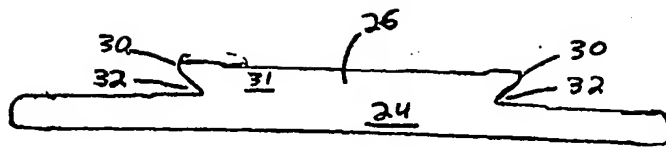


Figure 6

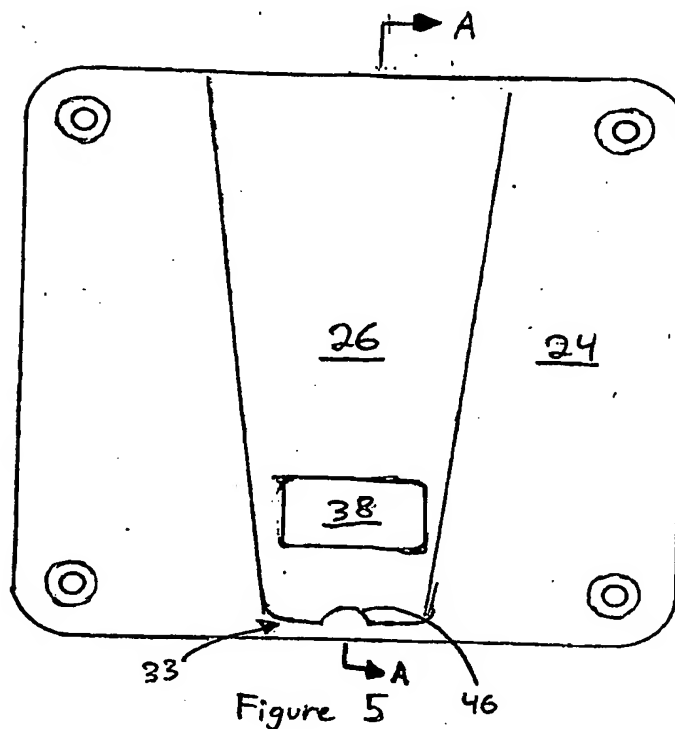


Figure 5

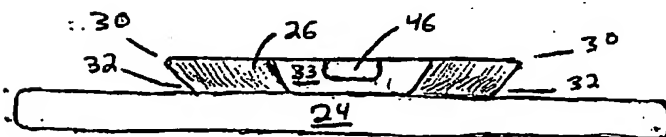


Figure 8.

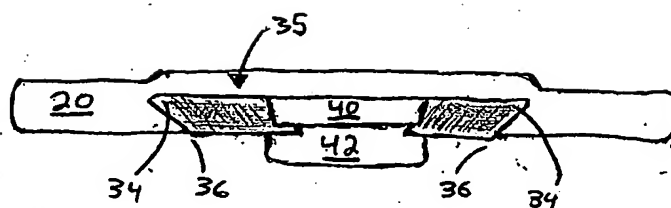


Figure 9

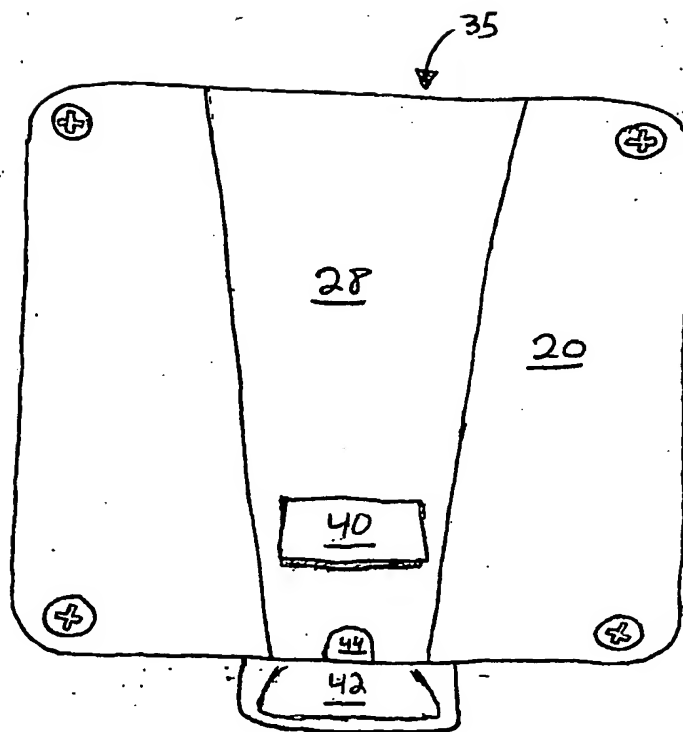


Figure 10

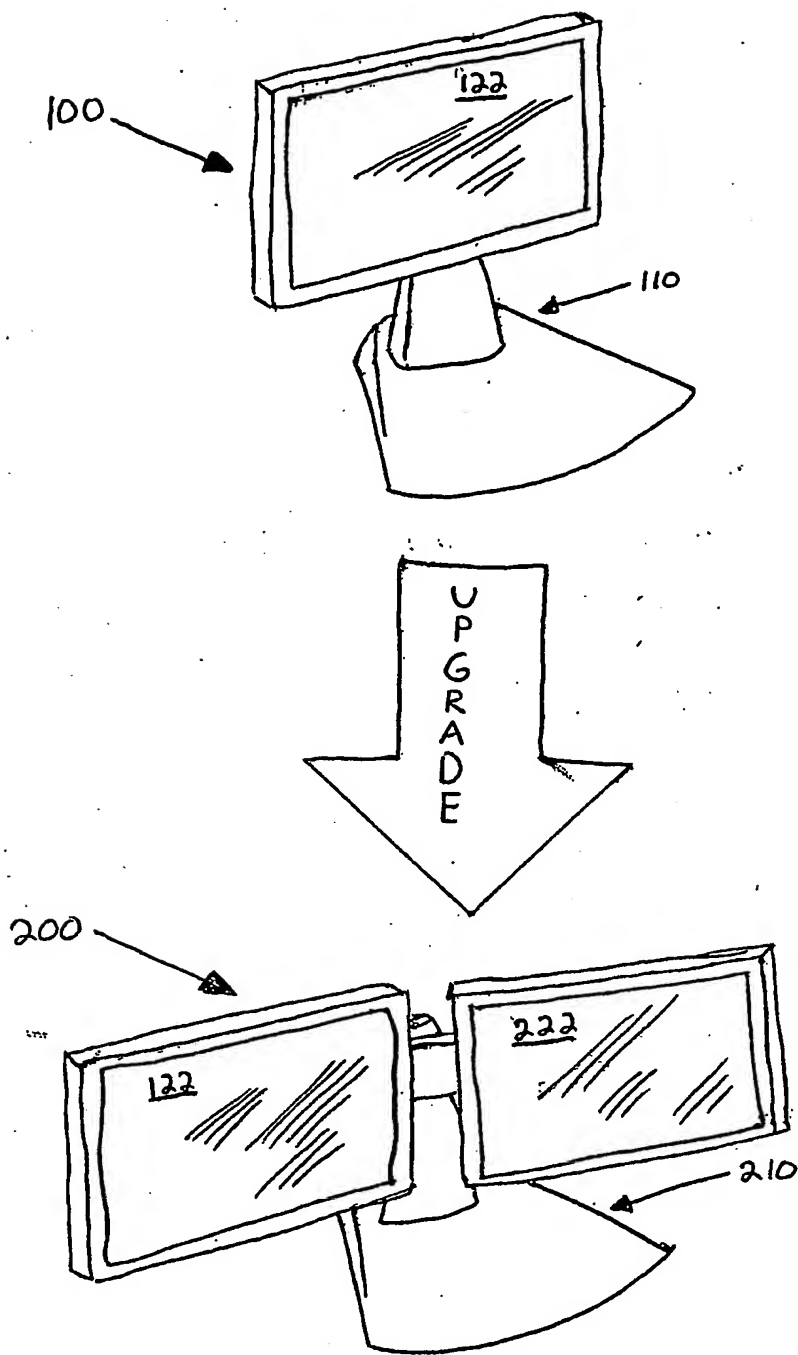


Figure 11

Figure 12

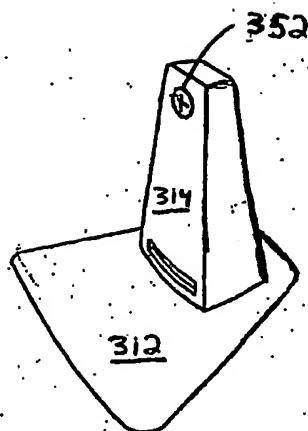


Figure 14

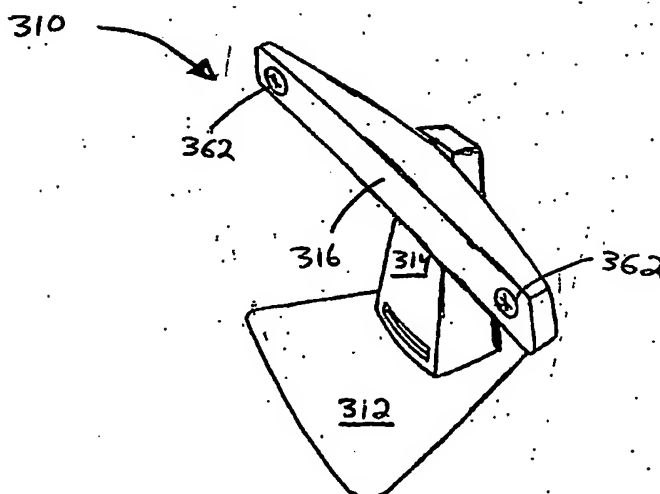
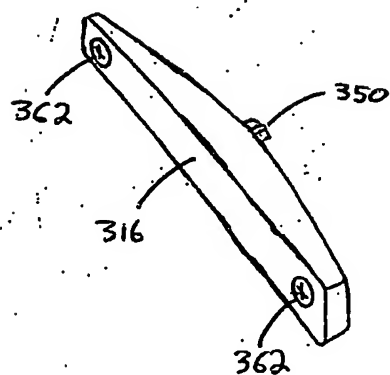


Figure 13



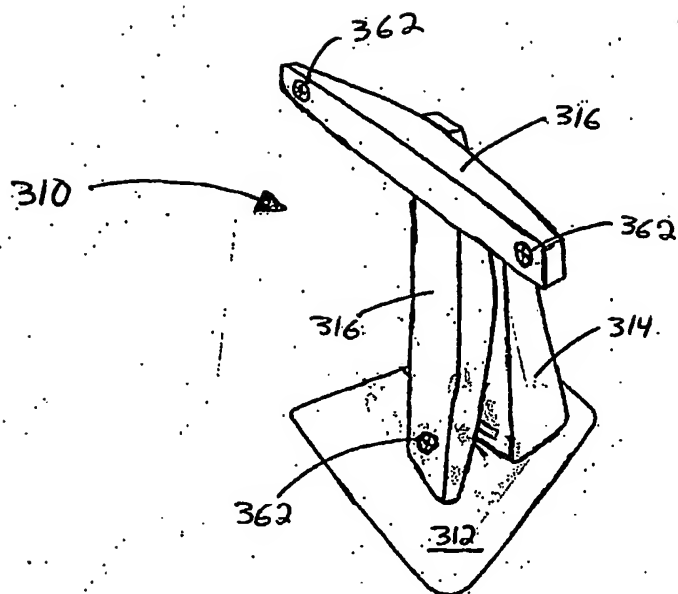


Figure 15

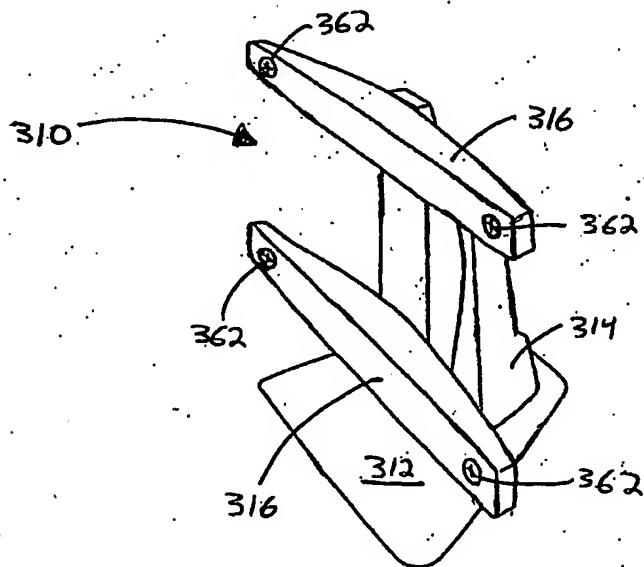


Figure 16



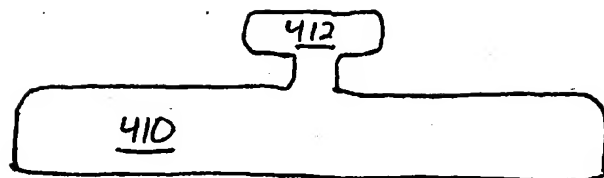


Figure 17

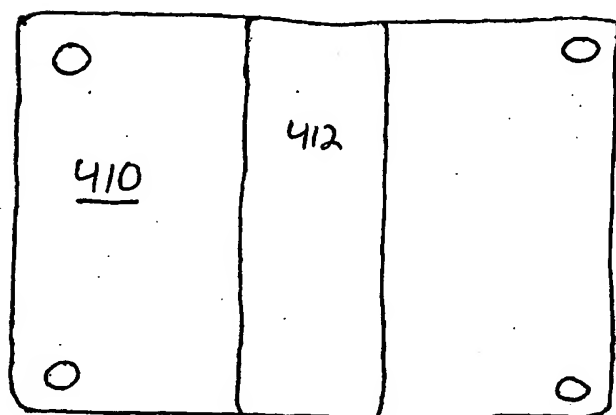


Figure 18

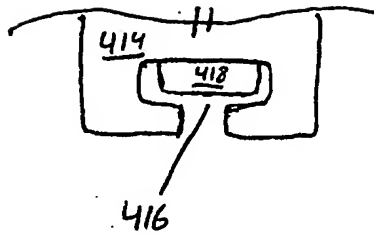


Figure 19

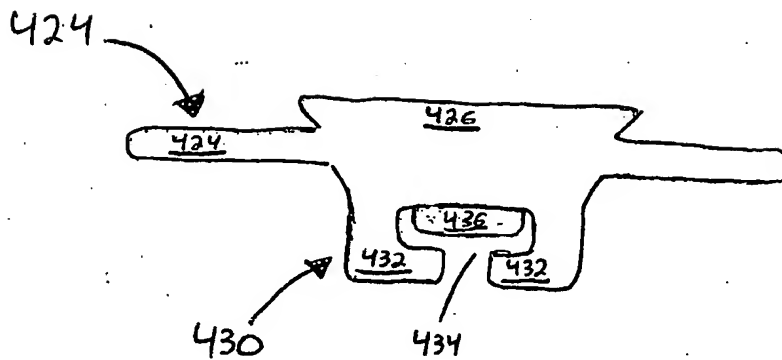


Figure 20

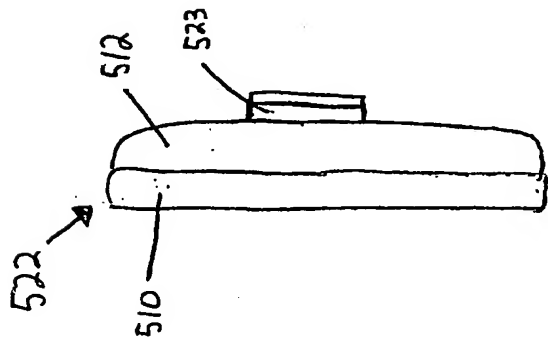


Figure 21

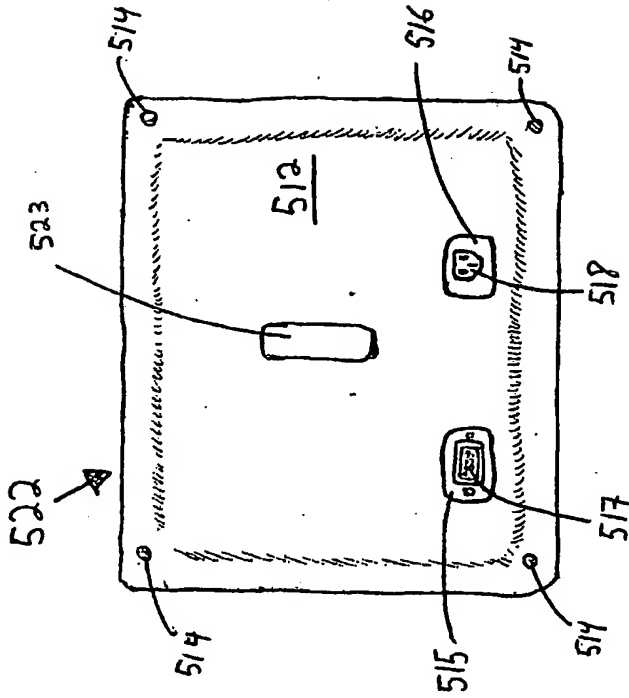


Figure 22

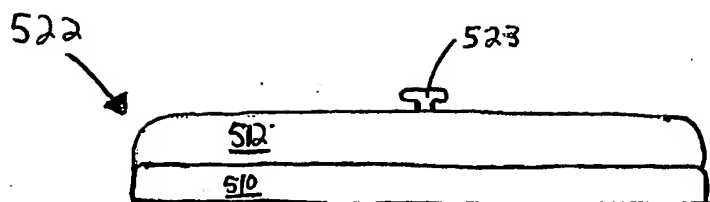


Figure 23

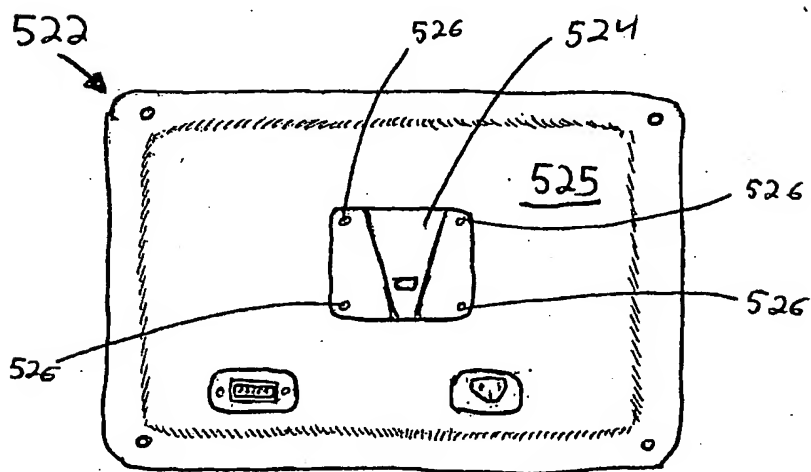


Figure 24

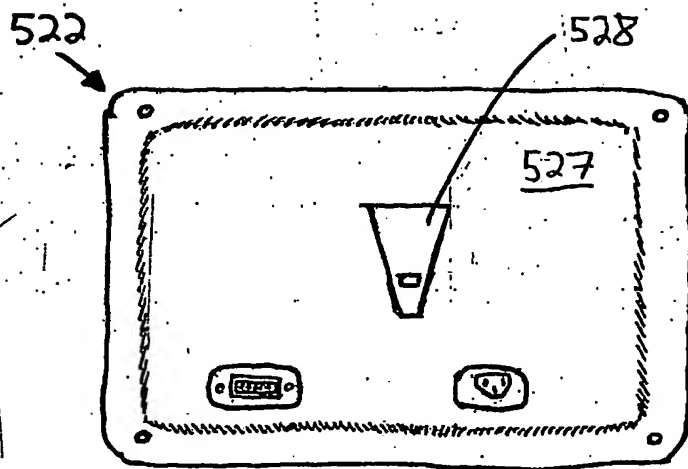


Figure 25

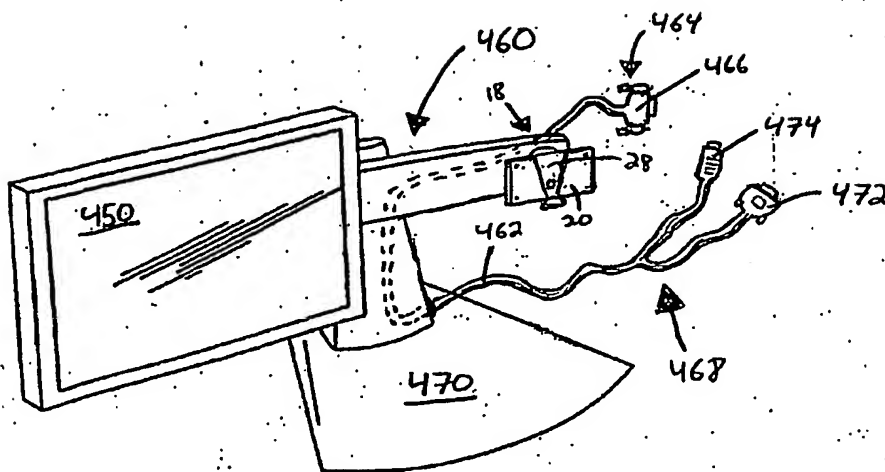


Figure 26

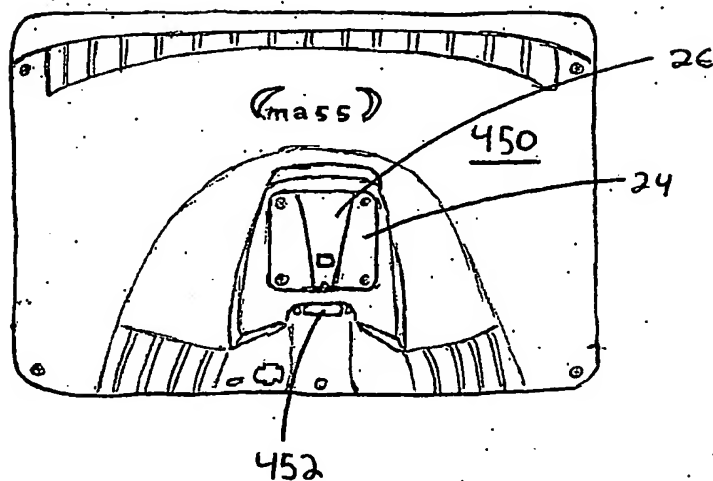


Figure 27

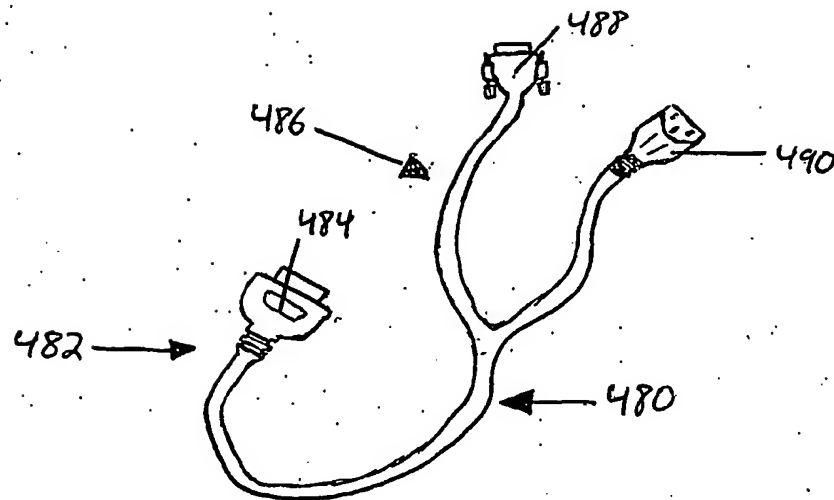


Figure 28

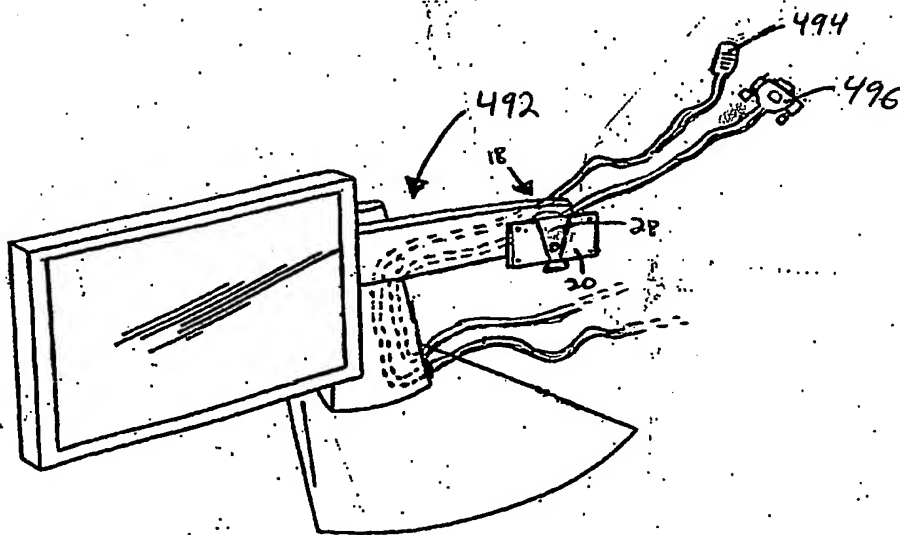


Figure 29

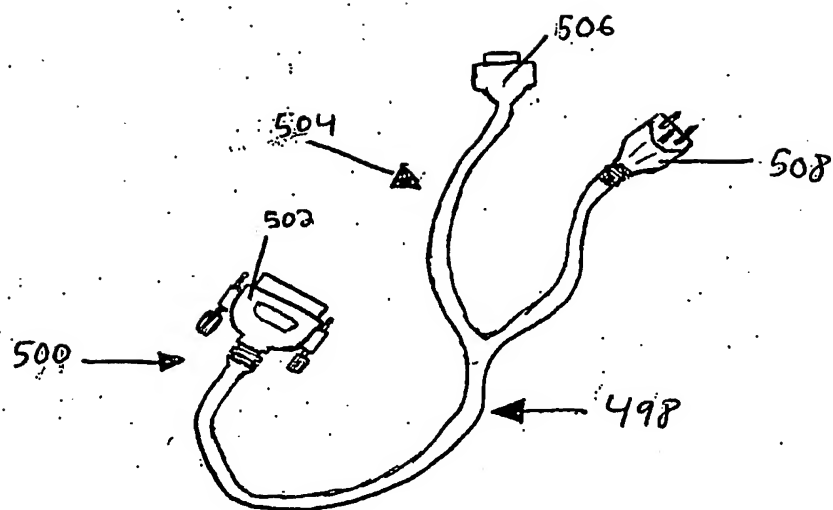


Figure 30



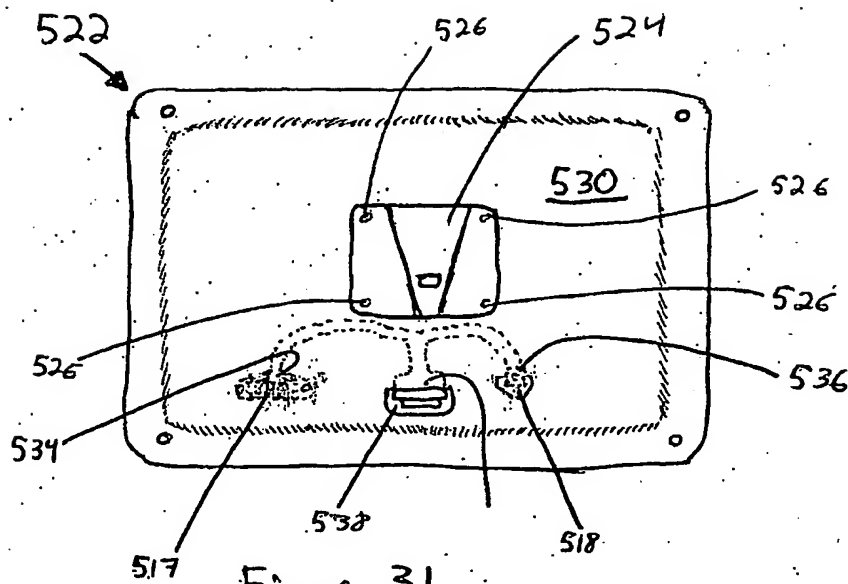


Figure 31

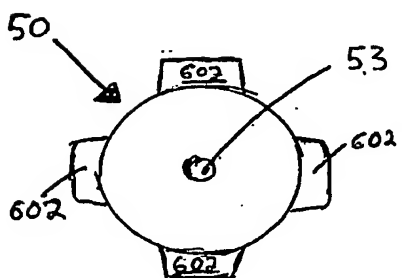


Figure 32

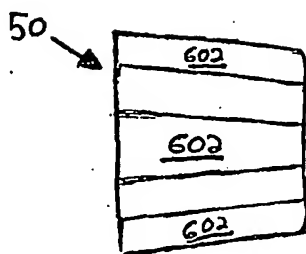


Figure 33

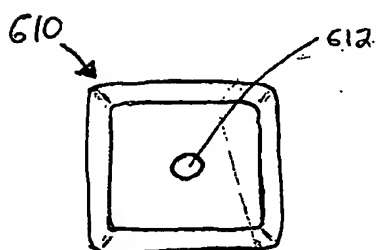


Figure 34

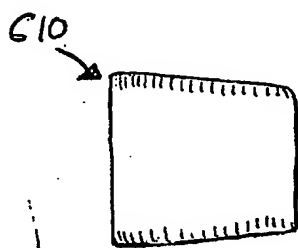


Figure 35

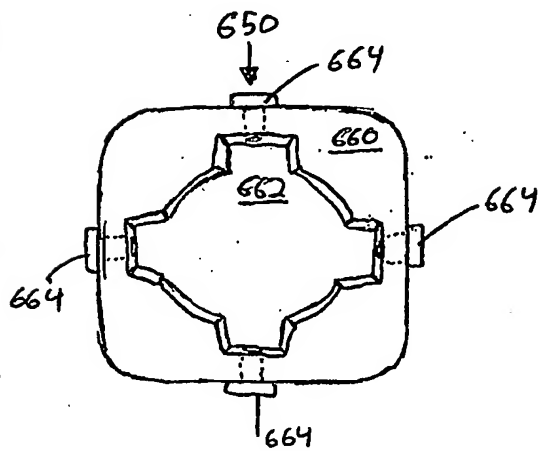


Figure 36

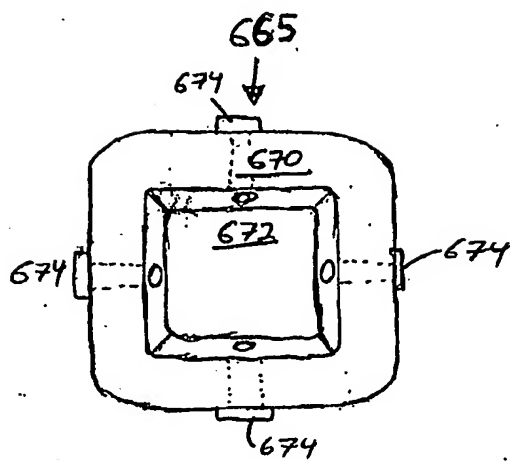


Figure 37

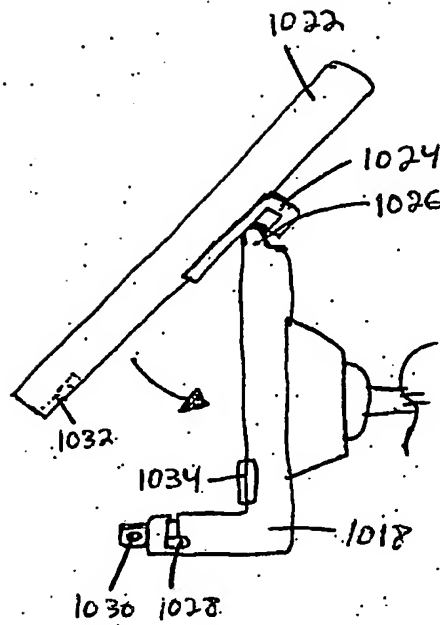


Figure 38

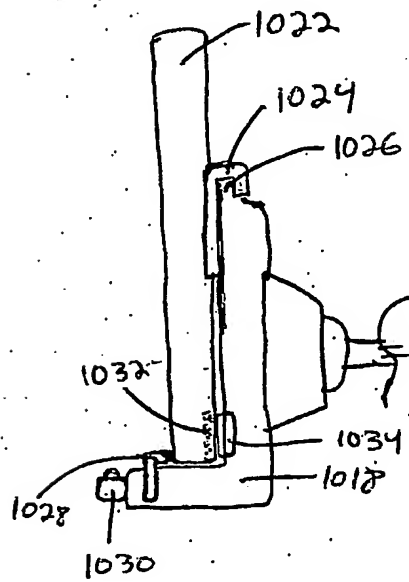


Figure 39